Vegetation Biomass and Nutrient Analysis for Stormwater Treatment Area 1 West (STA-1W)

1st Status Report

May 10, 2002

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Introduction and Background

On October 2, 2001 DB Environmental, Inc. (DBE) entered into a 12-month contract with the South Florida Water Management District to collect and analyze vegetation in Cells 1, 2, 3 and 4 of STA-1W (formerly the Everglades Nutrient Removal Project (ENRP)). The objective of this study is to characterize the percent cover of plant species and estimate biomass of the three dominant vegetation communities along the nutrient gradient in the ENRP. These communities are the emergent macrophytes (primarily *Typha* [cattail]), floating macrophytes (*Pistia stratiotes* [water lettuce] and *Eichhornia crassipes* [water hyacinth]) and submerged aquatic vegetation (SAV) (*Ceratophyllum demersum* [coontail] and *Najas guadalupensis* [southern niad]). In addition, we will assess effects of seasonality on the standing crop and composition of the floating and SAV species.

Specific research questions to be addressed in this project are:

1. What is the species composition and the percent cover of the selected plant communities for the sampling points along the ENRP nutrient gradient?
2. What is the biomass (wet and dry weight) and nutrient content of the dominant species in each sample along the ENRP nutrient gradient?

3. Does seasonality affect the biomass and composition of the floating and SAV plant communities?
4. How do the existing *Typha* communities compare with the *Typha* communities during 1995 and 1996, when the ENRP was still in a "start-up" phase?

Question #1 will be addressed by analysis of percent cover by plant species or periphyton type at the sampling stations. Question #2 will be addressed by measuring the wet and dry biomass and elemental composition (TP, TN, TC, ash content) of subsamples of the dominant plant species. Question #3 will be addressed by comparing the percent cover, biomass and nutrient analyses of the samples collected during the winter and summer seasons. Question #4 will be addressed by comparing the *Typha* data acquired during this study with historical District biomass and composition data for *Typha*.

This document is a status report detailing work efforts from October 2001 through February 2002. The major efforts during this period included developing a project work plan, performing the *Typha* sampling and performing the first of two sampling events for the SAV and floating species.

Task 1: Project Work Plan

The Project Kickoff Meeting was held with District personnel on October 25, 2001 to discuss sampling locations and techniques to be included in the project work plan. Some of the issues covered included:

- desired sampling locations (e.g., with respect to previous District sampling sites, and as a function of dominant community [floating, submerged, emergent] and location along the nutrient gradient);
- desired quadrat size;
- desired method of dealing with 'non-dominant' species (with respect to identification and analyses), and;
- desired level of replication for statistical and QA purposes.

It was decided that the sampling protocol would be altered from the original proposal in order to build upon the District's 1995 & 1996 vegetation data set for STA-1W Cell 1. Upon reviewing this dataset, sampling strategies for this project were determined. A final project work plan was accepted by the District on January 31, 2002.

Task 2: Field Sampling

SAV and Floating Macrophytes

In February 2002, we collected samples for the SAV and floating macrophytes winter sampling event. DBE personnel visually established sampling locations based on the following three criteria: 1) the plant bed needed to be of sufficient size (at least 40 m^2); 2) the bed needed to be dominated by the species of interest; and 3) the vegetation needed to be healthy. Once locations were established samples were collected for *Ceratophyllum*, *Eichhornia* and *Pistia* in the inflow and outflow regions of Cells 1, 2 and 3. We were unable to locate *Najas* plant beds that met the above criteria in the inflow regions of Cells 2 and 3. Therefore, *Najas* samples were collected in the outflow and mid regions of Cells 2 and 3 respectively, in addition to the inflow and outflow regions of Cell 1, the outflow region of Cell 3 and the outflow region of Cell 2 (Figure 1). Four random vegetation samples were collected at each location. GPS coordinates were also recorded for each sampling location (see Appendix for coordinates).

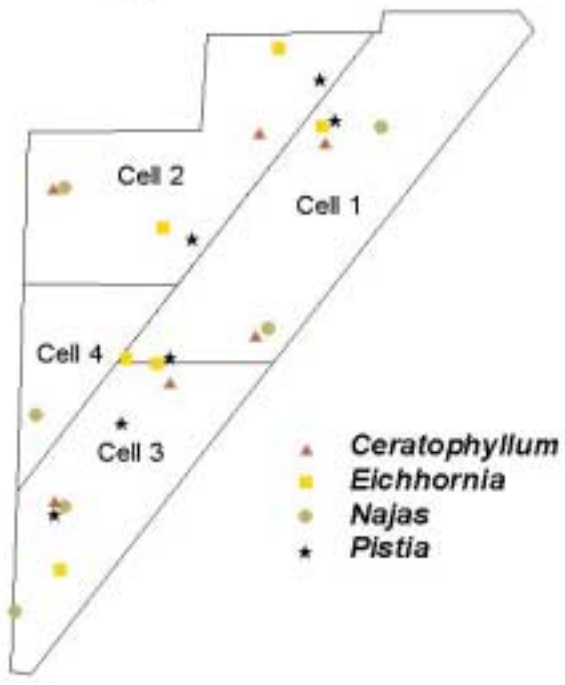

Figure 1. Sampling locations for SAV and floating plant beds in Cells 1 – 4 of STA-1W.

Floating vegetation was collected from within a 1 m^2 PVC quadrat. Upon quadrat placement a photo was taken and percent cover of the surface area within the quadrat was assessed using visual coverage definitions of 25, 50, 75 and 100% (see Appendix for photos and percent cover for each quadrat). Samples were collected by hand-gathering all plant biomass (above and below ground if applicable) within the quadrat, and placing it in a large plastic bag for transportation back to the on-site trailer. At the trailer, samples were rinsed, separated and identified by species. The total wet weight of the entire biomass of the dominant species for each quadrat was determined using a Chatillon hanging spring balance with a 20kg capacity. A subsample of the dominant species was then collected by randomly selecting three plants. The wet weight of this subsample was recorded using an Ohaus triple beam balance with a 2610g capacity. The subsample was placed in a cooler, on ice, and sent to the lab within 24 hours for further biomass and nutrient analyses.

SAV samples were collected using a 1 m^2 box corer that was 1 m in length on each side and 0.9 m in depth. The sides were constructed of 22 gauge plated steel and reinforced with wooden braces. Upon placement of the box corer a photo was taken and percent vegetation cover of the surface was assessed (see Appendix for photos and percent cover for each quadrat). Samples were collected by using a rake to hand-gather all plant biomass (above and below ground if applicable) within the box corer. The SAV biomass was then placed in a large plastic bag for transportation back to the laboratory. Upon arrival at the laboratory the samples were rinsed, separated and identified by species. A total wet weight of the entire biomass of the dominant species for each box core was determined using a Chatillon hanging spring balance with a 60 lb capacity. A subsample, consisting of three random handfuls, was then collected. Wet weight biomass was measured using a Sartorius top pan balance with a 6100 g capacity in preparation for further biomass and nutrient analyses .

Table 1 depicts the average percent cover of the four random quadrats for each plant bed location. Percent cover was determined by visually evaluating the surface area within the quadrat and noting any species that comprised 25, 50, 75 or 100% of the area. All sampling points had 100% cover for the species of interest except for the Cell 2 outflow *Najas* sample (comprised of 75% *Najas* and 25% *Ceratophyllum*) and the Cell 3 inflow *Ceratophyllum* sample (3

of the four sample plots contained 75% *Ceratophyllum* and 25% dead emergent foliage and roots/open water; the fourth sample plot was 100% *Ceratophyllum).*

Table 1. Average percent cover of the four random sampling points for the SAV and floating macrophyte locations sampled during winter 2002 at the inflow and outflow regions of the STA-1W treatment cells.

	Eichhornia	***Pistia***	***Ceratophyllum***	***Najas***
Cell 1 Inflow	100%‡	100%	100%	100%
Cell 1 Outflow	100%	100%	100%	100%
Cell 2 Inflow	100%	100%	100%	NS†
Cell 2 Outflow	100%	100%	100%	75% *Najas* 25% *Ceratophyllum*
Cell 3 Inflow	100%	100%	80% *Ceratophyllum* 20% dead emergent foliage and roots/open water*	100%£
Cell 3 Outflow	100%	100%	100%	100%
Cell 4 Outflow	NS	NS	NS	100%

‡ % for the species of interest at this location.
† Not sampled at this location
£ Sampled in the mid region of Cell 3
* 3 of the 4 plots were 75% Ceratophyllum and 25% dead emergent foliage and roots/open water; the 4th plot was 100% Ceratophyllum

During the plant rinsing and species separation process, DBE field personnel identified the non-dominant species located within each quadrat. Figure 2 depicts the non-dominant species associated with each plant community location (four sampling plots within each bed) for the *Najas*- and *Ceratophyllum*-dominated beds. *Hydrilla* was observed in the *Ceratophyllum*-dominated plant beds in both the inflow and outflow locations of Cells 1 and 2, but it was much more prevalent in the Cell 2 locations. *Najas* was observed in small amounts at all sites except for the Cell 3 inflow sampling location in which was not present. Filamentous periphyton was noted in the outflow locations of Cells 1 and 2 and in both inflow and outflow of Cell 3. A small amount of *Eichhornia* and *Pistia* plants were observed in the outflow locations of Cells 2 and 3, respectively. A small amount of *Eleocharis*, as well as a large accumultion of unidentifiable dead emergent stems and roots, were observed in the inflow location of Cell 3.

Hydrilla was observed in the *Najas*-dominated plant beds in the outflow locations of Cells 1 and 2; and as with the Ceratophyllum-dominated plant beds, *Hydrilla* was much more prevalent in the Cell 2 location. *Ceratophyllum* also was observed at all *Najas* locations. Of those locations it was most prominent in the outflow region of Cell 2 and the mid region of Cell 3. Filamentous periphyton was noted in the outflow regions of Cells 1 and 2 and in both locations in Cell 3. Some dead emergent stems and roots were observed in the mid location of Cell 3 (Figure 2).

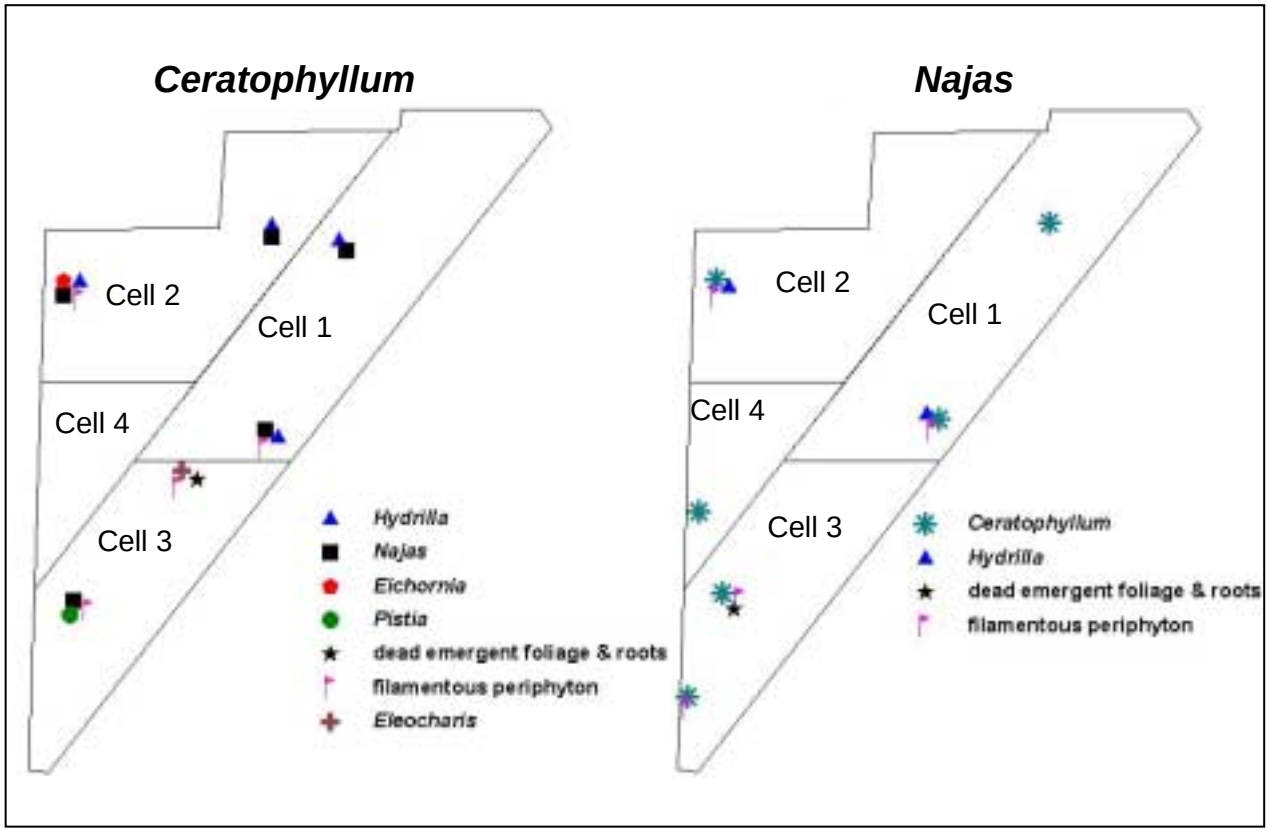

Figure 2. Non-dominant plant species in the *Ceratophyllum*- and *Najas*-dominated plant beds.

Figure 3 depicts the non-dominant species associated with each plant bed location (four sampling plots within each bed) for the *Eichhornia* and *Pistia* communities. In the *Eichhornia*-dominated plant beds the most common non-dominant species was *Lemna*, which was found at all locations. *Hydrocotyle* and *Pistia* were observed at both the inflow and outflow of Cell 2, and *Salivina* was present at the inflow of Cells 1 and 2. *Polygonum*, *Typha*, *Ceratophyllum* and *Hydrilla*

were each observed in at least one of the floating plant beds within STA-1W (Figure 3). No non-dominant species were noted at the Cell 1 outflow location.

As noted in the *Eichhornia* dominated plant beds, all the *Pistia*-dominated plants beds contained *Lemna*. *Hydrocotyle* was observed at the inflow location of Cell 1 and in both locations in Cell 2. *Typha* was present at both locations in Cell 2 and at the outflow location of Cell 3. Some filamentous periphyton was observed at the outflow of Cell 2. No non-dominant species were noted at the Cell 1 outflow location (Figure 3).

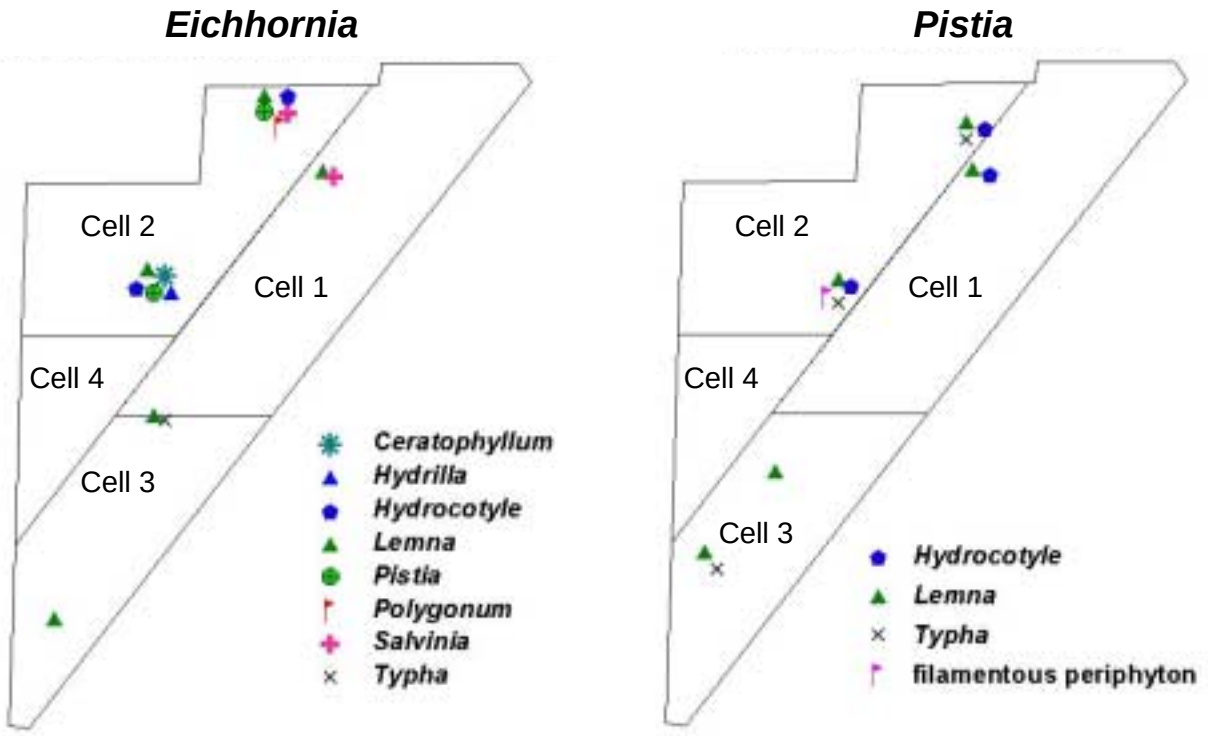

Figure 3. Non-dominant plant species in the *Eichhornia*- and *Pistia*-dominated plant beds.

Typha

In February 2002, *Typha* samples were collected in the inflow and outflow regions of Cells 1 and 2, and in the outflow regions of Cells 3 and 4. For Cell 1, the selected inflow and outflow locations coincided with 1995 District sampling locations #16 and #19, respectively (Figure 4).

Before sampling, DBE personnel visually established sampling locations based on the following four criteria: 1) the size of the plant bed was adequate (at least 40 m^2); 2) the community was dominated by *Typha*; 3) the vegetation was healthy; and 4) the plants were rooted (not floating). To represent the entire bed, four random samples were collected at each location. GPS coordinates were also recorded for each sampling location (see Appendix for coordinates).

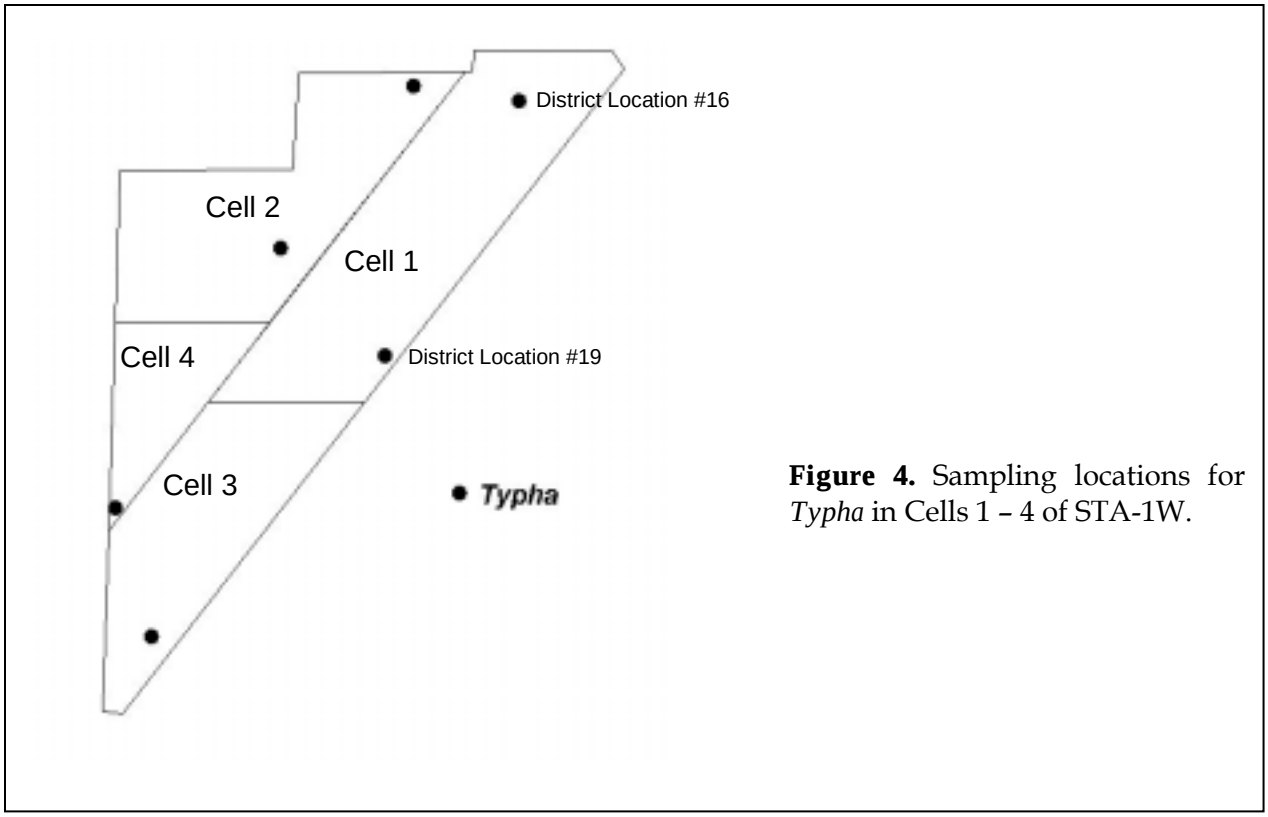

Figure 4. Sampling locations for *Typha* in Cells 1 – 4 of STA-1W.

Typha samples were collected using a 0.5 m^2 PVC quadrat and shovel. Upon quadrat placement a photo was taken and percent surface cover of each species within the quadrat was assessed using visual categories of 25, 50, 75 and 100% (see Appendix for photos and percent cover for each quadrat). To collect the sample a shovel was used to dig up the roots (separating the plants within the quadrat from the surrounding plants). All plant biomass was then hand-gathered and placed in a large plastic bag for transportation back to the laboratory. Upon arrival at the laboratory, samples were rinsed, separated and identified by species. At this point the work plan stated that a subsample of three random plants would be determined; however, during collection it was difficult to keep the individual plants within the box corer intact. Therefore, we

separated the entire quadrat biomass of *Typha* in each quadrat into "above ground live", "above-ground dead" and "below-ground" tissues. The "above-ground" leaves were considered live if >5% of the tissue was green, otherwise it was considered dead. A total wet weight biomass measurement was determined for each tissue type prior to drying using a Chatillon hanging spring balance with a 60 lb capacity. After the dry weight biomass analyses are completed (March 2002), a subsample of each tissue type will be selected for nutrient analyses.

Table 2 depicts the average percent cover of the four random sampling points for each plant bed location. Percent cover was determined by visually assessing the area within the quadrat and noting any species that comprised 25, 50, 75 or 100% of the area. Of the six plant bed locations, three (Cell 1 inflow and outflow and Cell 3 outflow) exhibited 100% percent cover of *Typha*. Cell 2 inflow and outflow samples contained 30 and 50% cover of another species, respectively (see appendix for individual plots). Cell 4 outflow had 25% of *Eleocharis* present in one of the four sample locations within the plant bed, while the rest of the sample locations were comprised of 100% *Typha*.

Table 2. Average percent cover of the four random sampling points for *Typha* locations sampled during February 2002 at the inflow and outflow regions of the STA-1W treatment cells.

	Typha
Cell 1 Inflow	100%‡
Cell 1 Outflow	100%
Cell 2 Inflow	70% *Typha* 30% various floating species†
Cell 2 Outflow	50% *Typha* 40% misc floating and emergent species† 10% *Hydrocotyle*
Cell 3 Outflow	100%
Cell 4 Outflow	95% *Typha* 5% *Eleocharis*

‡ % for the species of interest at this location.
† No single species met the 25% criteria. See the section below for species identification.

Figure 5 shows the non-dominant species associated with each plant bed location (four sampling plots within each bed) for the *Typha* sampling sites. All locations contained at least two non-dominant species with the exception of the Cell 3 outflow, for which no other species were observed. Both *Eleocharis* and *Najas* were present in the Cell 4 outflow sampling location. In Cell 1, *Hydrocotyle*, *Lemna*, *Pistia* and *Salvinia* were noted in the inflow location and *Asclepias*, *Salvinia* and *Ludwigia* were observed in the outflow sampling location. Both *Typha* sampling locations in Cell 2 contained several non-dominant emergent and floating species (Figure 5).

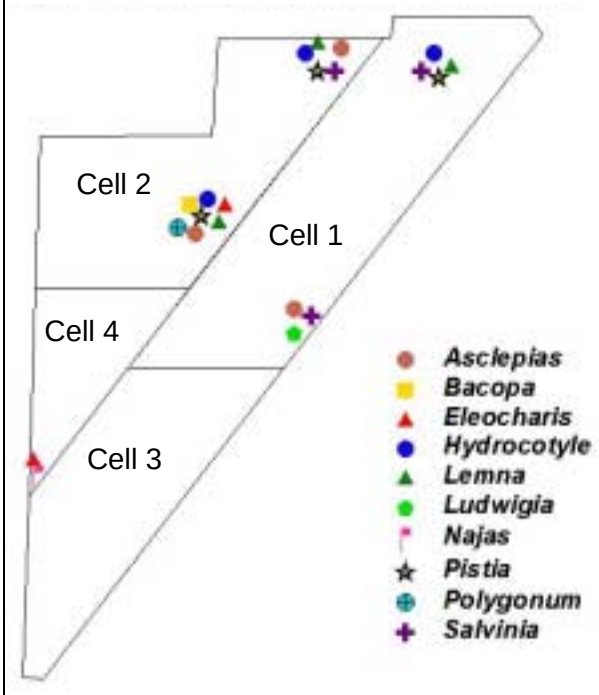

Figure 5. Non-dominant plant species in the *Typha* plant beds.

Task 3: Laboratory Analyses

During April 2002, DBE laboratory personnel will continue to process the plants sampled in February, preparing them for biomass and nutrient analyses (dry weight, TP, TN, TC, and ash content). The results of these analyses will be provided in the next status report.

Appendix

Plant bed GPS coordinates

	Latitude (decimal degrees)	Longitude (decimal degrees)
Cell 1 *Ceratophyllum* Inflow	26.647970	-80.416850
Cell 1 *Ceratophyllum* Outflow	26.630170	-80.423267
Cell 2 *Ceratophyllum* Inflow	26.648900	-80.422950
Cell 2 *Ceratophyllum* Outflow	26.643780	-80.441917
Cell 3 *Ceratophyllum* Inflow	26.625750	-80.431200
Cell 3 *Ceratophyllum* Outflow	26.614530	-80.441400
Cell 1 *Najas* Inflow	26.649320	-80.411633
Cell 1 *Najas* Outflow	26.630750	-80.422033
Cell 2 *Najas* Outflow	26.643780	-80.441917
Cell 3 *Najas* Inflow	26.614330	-80.440867
Cell 3 *Najas* Outflow	26.604550	-80.445367
Cell 4 *Najas* Outflow	26.622660	-80.443344
Cell 1 *Eichhornia* Inflow	26.649980	-80.416567
Cell 1 *Eichhornia* Outflow	26.627920	-80.435117
Cell 2 *Eichhornia* Inflow	26.656620	-80.421067
Cell 2 *Eichhornia* Outflow	26.640030	-80.431700
Cell 3 *Eichhornia* Outflow	26.608400	-80.441233
Cell 3 *Eichhornia* Inflow	26.627500	-80.431800
Cell 1 *Pistia* Inflow	26.649980	-80.416567
Cell 1 *Pistia* Outflow	26.628130	-80.431117
Cell 2 *Pistia* Inflow	26.653850	-80.417267
Cell 2 *Pistia* Outflow	26.639030	-80.429017
Cell 3 *Pistia* Inflow	26.622070	-80.435517
Cell 3 *Pistia* Outflow	26.614470	-80.441533
Cell 1 *Typha* Outflow	26.631839	-80.419653
Cell 1 *Typha* Inflow	26.655369	-80.407383
Cell 2 *Typha* Inflow	26.656730	-80.417090
Cell 2 *Typha* Outflow	26.641750	-80.429294
Cell 3 *Typha* Outflow	26.605883	-80.441250
Cell 4 *Typha* Outflow	26.617790	-80.444496

The following pages provide photos for each sample plot location. All photos are included on the attached CD in .jpeg format. The caption underneath each photo identifies the file name.

Tables showing date sampled, percent cover and the non-dominant species identified for each sample plot during the February 2002 sampling events. The sample ID corresponds with the previous photo names.

***Ceratophyllum*-dominated sample plots**

Sample ID	Date Sampled	Percent Cover	Non-Dominant Species
Cell 1 Cer Inflow 1	2/8/2002	100 % *Ceratophyllum*	*Hydrilla*
Cell 1 Cer Inflow 2	2/8/2002	100 % *Ceratophyllum*	*Najas*
Cell 1 Cer Inflow 3	2/8/2002	100 % *Ceratophyllum*	*Najas*
Cell 1 Cer Inflow 4	2/8/2002	100 % *Ceratophyllum*	*Hydrilla*
Cell 1 Cer Outflow 1	2/8/2002	100 % *Ceratophyllum*	*Najas*, *Hydrilla*
Cell 1 Cer Outflow 2	2/8/2002	100 % *Ceratophyllum*	*Najas*, *Hydrilla*, filamentous periphyton
Cell 1 Cer Outflow 3	2/8/2002	100 % *Ceratophyllum*	*Najas*
Cell 1 Cer Outflow 4	2/8/2002	100 % *Ceratophyllum*	*Hydrilla*, *Najas*
Cell 2 Cer Inflow 1	2/12/2002	100 % *Ceratophyllum*	*Hydrilla*, *Najas*
Cell 2 Cer Inflow 2	2/12/2002	100 % *Ceratophyllum*	*Hydrilla*, *Najas*
Cell 2 Cer Inflow 3	2/12/2002	100 % *Ceratophyllum*	*Hydrilla*, *Najas*
Cell 2 Cer Inflow 4	2/12/2002	100 % *Ceratophyllum*	*Hydrilla*
Cell 2 Cer Outflow 1	2/12/2002	100 % *Ceratophyllum*	*Hydrilla*, *Najas*
Cell 2 Cer Outflow 2	2/12/2002	100 % *Ceratophyllum*	*Hydrilla*, *Najas*, filamentous periphyton
Cell 2 Cer Outflow 3	2/12/2002	100 % *Ceratophyllum*	*Hydrilla*, *Najas*
Cell 2 Cer Outflow 4	2/12/2002	100 % *Ceratophyllum*	*Hydrilla*, *Najas*, *Hycena*
Cell 3 Cer Inflow 1	2/14/2002	75 % *Ceratophyllum* 25% dead emergent foliage and roots/open water	dead emergent foliage and roots, filamentous periphyton, *Eleocharis*

Sample ID	Date Sampled	Percent Cover	Non-Dominant Species
Cell 3 Cer Inflow 2	2/14/2002	100 % *Ceratophyllum*	dead emergent foliage and roots, filamentous periphyton
Cell 3 Cer Inflow 3	2/14/2002	75 % *Ceratophyllum* 25% dead emergent foliage and roots/open water	dead emergent foliage and roots, filamentous periphyton
Cell 3 Cer Inflow 4	2/14/2002	75 % *Ceratophyllum* 25% dead emergent foliage and roots/open water	dead emergent foliage and roots, filamentous periphyton
Cell 3 Cer Outflow 1	2/14/2002	100 % *Ceratophyllum*	*Najas*, filamentous periphyton
Cell 3 Cer Outflow 2	2/14/2002	100 % *Ceratophyllum*	*Pistia*
Cell 3 Cer Outflow 3	2/14/2002	100 % *Ceratophyllum*	*Pistia*
Cell 3 Cer Outflow 4	2/14/2002	100 % *Ceratophyllum*	*Pistia*, filamentous periphyton

***Najas*-dominated sample plots**

Sample ID	Date Sampled	Percent Cover	Non-Dominant Species
Cell 1 Naj Inflow 1	2/8/2002	100 % *Najas*	*Ceratophyllum*
Cell 1 Naj Inflow 2	2/8/2002	100 % *Najas*	*Ceratophyllum*
Cell 1 Naj Inflow 3	2/8/2002	100 % *Najas*	*Ceratophyllum*
Cell 1 Naj Inflow 4	2/8/2002	100 % *Najas*	*Ceratophyllum*
Cell 1 Naj Outflow 1	2/8/2002	100 % *Najas*	*Hydrilla, Najas*
Cell 1 Naj Outflow 2	2/8/2002	100 % *Najas*	*Hydrilla*
Cell 1 Naj Outflow 3	2/8/2002	100 % *Najas*	*Ceratophyllum*
Cell 1 Naj Outflow 4	2/8/2002	100 % *Najas*	*Hydrilla*, *Ceratophyllum*, filamentous periphyton

Sample ID	Date Sampled	Percent Cover	Non-Dominant Species
Cell 2 Naj Inflow 1	2/12/2002	75 % *Najas* 25% *Ceratophyllum*	*Hydrilla*, *Ceratophyllum*
Cell 2 Naj Inflow 2	2/12/2002	75 % *Najas* 25% *Ceratophyllum*	*Hydrilla*, *Ceratophyllum*
Cell 2 Naj Inflow 3	2/12/2002	75 % *Najas* 25% *Ceratophyllum*	*Hydrilla*, *Ceratophyllum*, filamentous periphyton
Cell 2 Naj Inflow 4	2/12/2002	75 % *Najas* 25% *Ceratophyllum*	*Hydrilla*, *Ceratophyllum*
Cell 3 Naj Inflow 1	2/14/2002	100 % *Najas*	*Ceratophyllum*, filamentous periphyton
Cell 3 Naj Inflow 2	2/14/2002	100 % *Najas*	dead emergent foliage and roots, filamentous periphyton
Cell 3 Naj Inflow 3	2/14/2002	100 % *Najas*	dead emergent foliage and roots, filamentous periphyton
Cell 3 Naj Inflow 4	2/14/2002	100 % *Najas*	*Ceratophyllum*, filamentous periphyton
Cell 3 Naj Outflow 1	2/14/2002	100 % *Najas*	*Ceratophyllum*
Cell 3 Naj Outflow 2	2/14/2002	100 % *Najas*	na
Cell 3 Naj Outflow 3	2/14/2002	100 % *Najas*	*Ceratophyllum*, filamentous periphyton
Cell 3 Naj Outflow 4	2/14/2002	100 % *Najas*	na

na: No non-dominant species identified within this quadrat

***Eichhornia*-dominated sample plots**

Sample ID	Date Sampled	Percent Cover	Non-Dominant Species
Cell 1 Eich Inflow 1	2/8/2002	100 % *Eichhornia*	*Lemna*, *Salivina*
Cell 1 Eich Inflow 2	2/8/2002	100 % *Eichhornia*	*Lemna*, *Salivina*
Cell 1 Eich Inflow 3	2/8/2002	100 % *Eichhornia*	*Lemna*, *Salivina*

Sample ID	Date Sampled	Percent Cover	Non-Dominant Species
Cell 1 Eich Inflow 4	2/8/2002	100 % *Eichhornia*	*Lemna, Salivina*
Cell 1 Eich Outflow 1	2/8/2002	100 % *Eichhornia*	na
Cell 1 Eich Outflow 2	2/8/2002	100 % *Eichhornia*	na
Cell 1 Eich Outflow 3	2/8/2002	100 % *Eichhornia*	na
Cell 1 Eich Outflow 4	2/8/2002	100 % *Eichhornia*	na
Cell 2 Eich Inflow 1	2/12/2002	100 % *Eichhornia*	*Lemna, Hydrocotyle, Salvinia, Pistia*
Cell 2 Eich Inflow 2	2/12/2002	100 % *Eichhornia*	*Lemna, Hydrocotyle, Salvinia, Pistia*
Cell 2 Eich Inflow 3	2/12/2002	100 % *Eichhornia*	*Lemna, Hydrocotyle, Polygonum*
Cell 2 Eich Inflow 4	2/12/2002	100 % *Eichhornia*	*Lemna, Hydrocotyle, Salvinia*
Cell 2 Eich Outflow 1	2/12/2002	100 % *Eichhornia*	*Lemna, Ceratophyllum, Hydrilla*
Cell 2 Eich Outflow 2	2/12/2002	100 % *Eichhornia*	*Lemna, Hydrilla*
Cell 2 Eich Outflow 3	2/12/2002	100 % *Eichhornia*	*Lemna, Hydrilla, Pistia*
Cell 2 Eich Outflow 4	2/12/2002	100 % *Eichhornia*	*Lemna, Hydrilla, Hydrocotyle*
Cell 3 Eich Inflow 1	2/14/2002	100 % *Eichhornia*	*Lemna*
Cell 3 Eich Inflow 2	2/14/2002	100 % *Eichhornia*	*Lemna*
Cell 3 Eich Inflow 3	2/14/2002	100 % *Eichhornia*	*Lemna*
Cell 3 Eich Inflow 4	2/14/2002	100 % *Eichhornia*	*Lemna, Typha*
Cell 3 Eich Outflow 1	2/14/2002	100 % *Eichhornia*	*Lemna*
Cell 3 Eich Outflow 2	2/14/2002	100 % *Eichhornia*	*Lemna*
Cell 3 Eich Outflow 3	2/14/2002	100 % *Eichhornia*	*Lemna*
Cell 3 Eich Outflow 4	2/14/2002	100 % *Eichhornia*	na

na: No non-dominant species identified within this quadrat

***Pistia*-dominated sample plots**

Sample ID	Date Sampled	Percent Cover	Non-Dominant Species
Cell 1 Pistia Inflow 1	2/8/2002	100 % *Pistia*	*Lemna, Hydrocotyle*
Cell 1 Pistia Inflow 2	2/8/2002	100 % *Pistia*	*Lemna, Hydrocotyle*
Cell 1 Pistia Inflow 3	2/8/2002	100 % *Pistia*	*Lemna, Hydrocotyle*
Cell 1 Pistia Inflow 4	2/8/2002	100 % *Pistia*	*Lemna, Hydrocotyle*
Cell 1 Pistia Outflow 1	2/8/2002	100 % *Pistia*	na
Cell 1 Pistia Outflow 2	2/8/2002	100 % *Pistia*	na
Cell 1 Pistia Outflow 3	2/8/2002	100 % *Pistia*	na
Cell 1 Pistia Outflow 4	2/8/2002	100 % *Pistia*	na
Cell 2 Pistia Inflow 1	2/12/2002	100 % *Pistia*	*Lemna, Hydrocotyle*
Cell 2 Pistia Inflow 2	2/12/2002	100 % *Pistia*	*Lemna, Hydrocotyle*
Cell 2 Pistia Inflow 3	2/12/2002	100 % *Pistia*	*Lemna, Hydrocotyle*
Cell 2 Pistia Inflow 4	2/12/2002	100 % *Pistia*	*Lemna, Hydrocotyle, Typha*
Cell 2 Pistia Outflow 1	2/12/2002	100 % *Pistia*	*Lemna, Hydrocotyle, Typha*
Cell 2 Pistia Outflow 2	2/12/2002	100 % *Pistia*	*Lemna, Hydrocotyle*
Cell 2 Pistia Outflow 3	2/12/2002	100 % *Pistia*	*Lemna,* filamentous periphyton
Cell 2 Pistia Outflow 4	2/12/2002	100 % *Pistia*	*Lemna*
Cell 3 Pistia Inflow 1	2/14/2002	100 % *Pistia*	*Lemna*
Cell 3 Pistia Inflow 2	2/14/2002	100 % *Pistia*	*Lemna*
Cell 3 Pistia Inflow 3	2/14/2002	100 % *Pistia*	na
Cell 3 Pistia Inflow 4	2/14/2002	100 % *Pistia*	na
Cell 3 Pistia Outflow 1	2/14/2002	100 % *Pistia*	*Lemna*

Sample ID	Date Sampled	Percent Cover	Non-Dominant Species
Cell 3 Pistia Outflow 2	2/14/2002	100 % *Pistia*	*Lemna, Typha*
Cell 3 Pistia Outflow 3	2/14/2002	100 % *Pistia*	*Lemna*
Cell 3 Pistia Outflow 4	2/14/2002	100 % *Pistia*	*Lemna*

na: No non-dominant species identified within this quadrat

***Typha*-dominated sample plots**

Sample ID	Date Sampled	Percent Cover	Non-Dominant Species
Cell 1 Typha Outflow 1	2/20/2002	100 % *Typha*	*Salvinia, Ludwigia*
Cell 1 Typha Outflow 2	2/20/2002	100 % *Typha*	*Asclepias*
Cell 1 Typha Outflow 3	2/20/2002	100 % *Typha*	*Asclepias, Salvinia*
Cell 1 Typha Outflow 4	2/20/2002	100 % *Typha*	*Asclepias*
Cell 1 Typha Inflow 1	2/20/2002	100 % *Typha*	*Hydrocotyle, Lemna, Pistia*
Cell 1 Typha Inflow 2	2/20/2002	100 % *Typha*	*Hydrocotyle, Lemna, Pistia, Salvinia*
Cell 1 Typha Inflow 3	2/20/2002	100 % *Typha*	*Hydrocotyle, Lemna, Pistia*
Cell 1 Typha Inflow 4	2/20/2002	100 % *Typha*	*Hydrocotyle, Lemna, Pistia*
Cell 3 Typha Outflow 1	2/20/2002	100 % *Typha*	na
Cell 3 Typha Outflow 2	2/20/2002	100 % *Typha*	na
Cell 3 Typha Outflow 3	2/20/2002	100 % *Typha*	na
Cell 3 Typha Outflow 4	2/20/2002	100 % *Typha*	na
Cell 4 Typha Outflow 1	2/26/2002	75 % *Typha* 25 % *Eleocharis*	*Najas*
Cell 4 Typha Outflow 2	2/26/2002	100 % *Typha*	*Najas*
Cell 4 Typha Outflow 3	2/26/2002	100 % *Typha*	*Eleocharis*

Sample ID	Date Sampled	Percent Cover	Non-Dominant Species
Cell 4 Typha Outflow 4	2/26/2002	100 % *Typha*	na
Cell 2 Typha Inflow 1	2/26/2002	75% *Typha* 25% various floating species	*Lemna, Salvinia, Pistia*
Cell 2 Typha Inflow 2	2/26/2002	50% *Typha* 50% various floating	*Hydrocotyle, Lemna, Salvinia*
Cell 2 Typha Inflow 3	2/26/2002	75% *Typha* 25% various floating species	*Salvinia, Lemna, Hydrocotyle, Pistia*
Cell 2 Typha Inflow 4	2/26/2002	75% *Typha* 25% various floating species	*Lemna, Hydrocotyle*
Cell 2 Typha Outflow 1	2/26/2002	75% *Typha* 25% misc floating/emergents	*Bacopa, Hydrocotyle, Polygonum, Lemna, Pistia*
Cell 2 Typha Outflow 2	2/26/2002	75% *Typha* 25% *Hydrocotyle* 25% misc floating/emergents	*Bacopa, Hydrocotyle, Lemna, Eleocharis, Pistia*
Cell 2 Typha Outflow 3	2/26/2002	75% *Typha* 25% *Hydrocotyle* 25% misc floating/emergents	*Hydrocotyle, Polygonum, Pistia, Lemna, Eleocharis*
Cell 2 Typha Outflow 4	2/26/2002	75% *Typha* 25% misc floating/emergents	*Polygonum, Hydrocotyle, Lemna, Pistia*

na: No non-dominant species identified within this quadrat